

REMARKS

By this Amendment, Claims 1-22 are pending in the application.

Reconsideration of the rejections set forth in the Official Action is respectfully requested in view of the above amendments and the following remarks.

Restriction Requirement

Applicants affirm their election of the subject matter recited in Claims 1-22 and also note that Claims 23 and 24 have been withdrawn from consideration. Claim 23 has been amended to depend from Claim 16. As stated in MPEP § 821.04, "if applicant elects claims directed to the product, and a product claim is subsequently found allowable, withdrawn process claims which depend from or otherwise include all the limitations of the allowable product claim will be rejoined" (emphasis added). Accordingly, once Claim 16 is found allowable, Claim 23 (and thus also dependent Claim 24) should be rejoined with the elected subject matter.

Rejection Under 35 U.S.C. §102

1. Claims 1-5, 7-9, 14-16, [18-21 inferred], 23 and 24 stand rejected under 35 U.S.C. 102(b) over U.S. Patent No. 6,475,336 to Hubacek for reasons stated on pages 2-4 of the Office Action. The rejection is respectfully traversed.

Claim 1 recites "A temperature-controlled hot edge ring assembly adapted to surround a semiconductor substrate support in a plasma reaction chamber, the assembly comprising:

a conductive lower ring;

a ceramic intermediate ring, the intermediate ring overlying the lower ring, the intermediate ring adapted to be attached via the lower ring to an RF electrode; and an upper ring, the upper ring overlying the intermediate ring, wherein the upper ring has an upper surface exposed to an interior of a plasma reaction chamber" (emphasis added).

Hubacek fails to disclose the combination of features including at least the emphasized feature recited in Claim 1. The Official Action refers to the configuration provided by Hubacek in Figure 1. In U.S. Patent No. 6,475,336, Figure 1, Hubacek discloses a lower electrode assembly for use in a parallel plate plasma reaction chamber comprising an edge ring chuck 17 that can extend completely across a coupling ring 15, an edge ring 18, a portion of which extends under the edge of the wafer 19, and a coupling ring 15 resting on a flange 16 of a baseplate 13. From a comparison of Hubacek Figure 1 to applicants' Figure 4, the Official Action appears to equate the edge ring 18 with the upper ring 120, the edge ring chuck 17 with the intermediate ring 130, and the coupling ring 15 with the lower ring 140.

In col. 6 line 16, Hubacek states: "The edge ring can be made from any suitable material with electrically conductive material such as silicon and silicon carbide being preferred", and col. 6 line 28, states: "The edge ring chuck and the wafer chuck can be made from any suitable materials such as those used in conventional electrostatic wafer chucks including anodized aluminum, polyimides and ceramic materials. The edge ring chuck (and optionally the wafer chuck) can be made from a ceramic material such as alumina or aluminum nitride with the

electrode or electrodes being made from any suitable conductive material".

Applicants submit that Hubacek does not provide disclosure of the combination of features recited in Claim 1, including at least a conductive lower ring.

Thus, because Hubacek fails to disclose each and every feature recited in Claim 1, Claim 1 is patentable.

Dependent Claims 2-5, 7-9, 14 and 15 also are patentable over U.S. Patent No. 6,475,336 to Hubacek for at least the same reasons as those discussed above regarding Claim 1. Moreover, these dependent claims recite additional combinations of features that further patentably distinguish the claimed subject matter over Hubacek. For example, Claim 4 recites that "the conductive ring is made of aluminum or alloy thereof", and Claim 5 recites that "the conductive ring is made of ... brass, copper, copper alloy or stainless steel. Applicants assert that Hubacek is silent on the choice of materials for the lower ring. Furthermore, with regard to examiner's reference of col. 6 lines 17-28 and col. 6 lines 28-49, Hubacek mentions possible material choices for the edge ring, the edge ring chuck, and the wafer chuck. The choices for all are materials that are ceramic (silicon carbide, alumina or aluminum oxide, aluminum nitride, silicon nitride), ceramic coated (anodized aluminum), polymeric (polyimide), or semiconducting (silicon, polysilicon).

Claim 8 recites that "...the conductive ring and the intermediate ring have a plurality of holes configured to bolt the intermediate ring to the conductive ring". With reference to Hubacek's Figures 1 and 2, dashed lines indicating bolt 24 do not

clearly extend into the edge ring chuck 17 (intermediate ring) and would therefore provide no clear means of clamping to it.

Thus, because Hubacek fails to disclose each and every feature recited in Claims 2-5, 7-9, 14 and 15, Claims 2-5, 7-9, 14 and 15 are patentable.

Independent Claim 16 is also patentable over U.S. Patent No. 6,475,336 to Hubacek for at least the same reasons as those discussed above regarding Claim 1.

Dependent Claims 18-21 also are patentable over U.S. Patent No. 6,475,336 to Hubacek for at least the same reasons as those discussed above regarding Claim 16. Moreover, these dependent claims recite additional combinations of features that further patentably distinguish the claimed subject matter over Hubacek. For example, Claim 18 recites that "the lower ring is made of aluminum or alloy thereof." Applicants assert that Hubacek is silent on the choice of materials for the lower ring.

Therefore, withdrawal of the rejection is respectfully requested.

Rejections Under 35 U.S.C. §103

1. Claims 6 and 17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Hubacek. The reasons for the rejection are stated on page 4 of the Official Action. The rejection is respectfully traversed.

Dependent Claims 6 and 17 are patentable over U.S. Patent No. 6,475,336 to Hubacek for at least the same reasons as those discussed above regarding Claim 1 and Claim 16.

2. Claims 10-13, 17 and 22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Hubacek in view of Koai et al. The reasons for the rejection are stated on pages 4-5 of the Official Action. The rejection is respectfully traversed.

Dependent Claims 10-13, 17 and 22 are patentable over U.S. Patent No. 6,475,336 to Hubacek for at least the same reasons as those discussed above regarding Claim 1 and Claim 16.

Moreover, these dependent claims recite additional combinations of features that further patentably distinguish the claimed subject matter over Hubacek. For example, Claim 12 reads "The assembly of Claim 1, further comprising a conductive washer...". Applicants submit that neither Hubacek nor Koai suggest nor render obvious the combination of features recited in Claim 12, including at least the feature of the use of a conductive washer. Furthermore, the Examiner's observation that "The motivation to combine the teachings of Hubacek and Koai et al. is to ensure that the components of the ring are secure..." still would not suggest or render obvious each and every feature recited in Claim 12.

Regarding Claim 13, neither Hubacek nor Koai discloses or renders obvious the combination of features recited in Claim 13, including at least the features of "...a plurality of holes in the upper ring, wherein the plurality of holes receive a cap, the

cap having a vent hole configured to release pressure from within the edge ring assembly". Even if Hubacek and Koai were combined in the manner advanced in the Official Action, the resulting combination still would not suggest or render obvious each and every feature recited in Claim 13.

Regarding Claim 22, the purge ring 280 of Koai shown in cross-section in Koai Fig. 2b, is situated below the edge ring assembly 200, the edge ring assembly 200 comprising top ring 240, middle ring 230 and bottom ring 220. Koai states "The purge ring 280, which is made of aluminum, is designed for directing a purge gas flow around the vertical edge 181 located at the top portion 150T of the pedestal 150" (col. 5, line 51). Thus even if Hubacek and Koai were combined in the manner advanced in the Official Action, the resulting combination still would not suggest or render obvious each and every feature recited in Claim 22.

Thus, the Official Action has failed to establish a *prima facie* case of obviousness regarding the plasma processing apparatus recited in Claims 12, 13 and 22. See MPEP § 2143. Therefore, Claims 12, 13 and 22 are patentable.

New Claims

Claim 25 depends from Claim 16 and recites that "the lower ring is made of aluminum, aluminum alloy, brass, copper, copper alloy or stainless steel." Support for the subject matter recited in Claim 25 is provided at paragraph [0033] of the present specification.

Conclusion

For the foregoing reasons, allowance of the application is earnestly solicited.

Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted at the number given below.

Respectfully submitted,

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